

What is claimed is:

1. A method for managing a request for an assignment of at least one uplink dedicated data channel in a network comprising a base station including a radio resource and access manager and a plurality of subscriber stations, where said base station can assign a dedicated data channel from a pool of unassigned dedicated data channels and can allocate a portion of radio resources to assign data rate capacity to an assigned channel, comprising:

a) receiving at said base station a request for a dedicated data channel from one subscriber station of said plurality of subscriber stations;

b) said radio resource and access manager determining if sufficient radio resources are available for providing said requested data channel and if a dedicated data channel is available for assignment from said pool of unassigned dedicated data channels, then

i) if said resources and said dedicated data channel are available, advancing to step (e);

ii) if said necessary resources are not available advancing to step (d);

iii) if said resources are available but said dedicated data channel is not available advancing to step (c);

c) determining whether at least one other subscriber station from said plurality of subscriber stations with an assigned dedicated data channel is eligible to have its said assigned dedicated data channel returned to said pool of unassigned dedicated data channels, then

iv) if at least one other subscriber station is eligible to have its said assigned dedicated data channel returned, returning said assigned dedicated data channel to said pool of unassigned dedicated data channels; then advancing to step (e); or

v) otherwise terminating the method;

d) determining whether at least one other subscriber station with an assigned dedicated channel with a first data rate capacity can be reduced to a lower data rate capacity to make radio resources available and reducing said first data rate capacity to free said associated radio resources available, then

vi) returning to step (b) if such a at least one subscriber station exists;

-32-

vii) terminating the method if such a at least one subscriber station does not exist;

and

e) assigning said dedicated data channel from said pool of unassigned dedicated data channels to said one subscriber station.

2. The method of claim 1, where said at least one other subscriber station in step (c) is eligible only if it has no reserved uplink resources.
3. The method of claim 2, where said at least one other subscriber station in step (c) is eligible only if it has a data rate as least as low as any other subscriber station with no reserved uplink resources.
4. The method of claim 3, where said at least one other subscriber station in step (c) is eligible only if it has been at said data rate for at least as long any other subscriber station with no reserved uplink resources.
5. The method of claim 4, where said at least one other subscriber station in step (c) is eligible only if it has been at said data rate for at least a pre-selected minimum holding time.
6. A method for managing the allocation of uplink resources in a network comprising a base station and a plurality of subscriber stations, each of said plurality of subscriber stations being independently allocated uplink resources to provide current data rate from a set of possible data rates, said method comprising:
 - a) receiving a message at said base station from one subscriber station of said plurality of subscriber stations, and
 - i) if said message indicates one of high amount of traffic waiting to be sent and low amount of traffic waiting to be sent, determining a desired data rate from said set of possible data rates for said one subscriber station, where said desired data rate is a different data rate than said current data rate;

-33-

- ii) otherwise ignoring said message and terminating the method;
- b) determining whether sufficient uplink resources are available to grant said desired data rate to said one subscriber station, then
 - iii) if sufficient uplink resources are available, advancing to step (e)
 - iv) if sufficient network are not available, advancing to step (c);
- c) determining whether at least one other subscriber station from said plurality of subscriber stations is eligible for a lower data rate, said at least one other subscriber station being eligible for a lower data rate if said current data rate for said at least one other subscriber station is greater than a minimum data rate allocated to said at least one subscriber station, then
 - v) if at least one other subscriber station is eligible for said lower data rate, advancing to step (d);
 - vi) otherwise, ignoring said message and terminating the method;
- d) determining which particular subscriber station from said at least one other subscriber stations eligible for said lower data rate will be subjected to said rate reduction and moving said particular subscriber station to said lower data rate, and then returning to step (b); and
- e) moving said one subscriber station to said desired data rate from said current data rate for said one subscriber station.

7. The method of claim 6, where said at least one other subscriber station in step (c) is eligible only if it has been at said data rate for at least as a pre-selected minimum holding time.

8. The method of claim 6, where said desired data rate is a data rate from said set of data rates and is one of one step higher and one step lower than said current data rate in said set of data rates.

9. The method of claims 6-8, where said minimum data rate is said sum of any reserved uplink resources on said at least one subscriber station.

10. A method for allocating a minimum uplink data rate to a subscriber station in a network

-34-

comprising a base station and a plurality of subscriber stations, each of said plurality of subscriber stations being independently allocated a current data rate from a set of possible data rates and said data rates requiring varying amounts of uplink radio resources, the method comprising:

- a) receiving a reservation request at said base station from one subscriber station of said plurality of subscriber stations;
- b) determining whether sufficient uplink radio resources are available to allocate said minimum data rate to said one subscriber station, then
 - i) if sufficient uplink radio resources are available, advancing to step (e);
 - ii) if sufficient uplink radio resources are not available, advancing to step (c);
- c) determining whether at least one other subscriber station from said plurality of subscriber stations is eligible for a lower data rate, then
 - iii) if at least one other subscriber station is eligible for said lower data rate, advancing to step (d);
 - iv) otherwise, ignoring said reservation request and terminating the method;
- d) determining which particular subscriber station from said at least one other subscriber stations eligible for said lower data rate will have be moved to said lower data rate and moving said particular subscriber station to said lower data rate, and then returning to step (b); and
- e) allocating said minjimum data rate to said one subscriber station.

11. The method of claim 10, where said minimum data rate is different than said current data rate for said subscriber station.

12. The method of claim 10, where said at least one other subscriber station in step (c) is eligible only if it has been at said data rate for at least as a pre-selected minimum holding time.

13. The method of claims 10-12, where said minimum data rate is said sum of any reserved uplink resources on said at least one subscriber station.

-35-

14. A method for managing uplink load in a network having a predetermined maximum uplink load level, said network comprising a base station and a plurality of subscriber stations, each of said plurality of subscriber stations being independently allocated a current data rate from a set of possible data rates, the method comprising:

a) determining said total uplink load in said network;

b) if said load is within a pre-selected range of said maximum uplink load, determining if an eligible subscriber station exists within said plurality of subscriber stations, said eligible subscriber station being capable of having its data rate reduced from its present data rate to a lower data rate in said set of possible data rates, and reducing said present data rate to said lower data rate and returning to step a);

c) otherwise, if said load is within a pre-selected range of said maximum uplink load and no eligible subscriber station exists, determining at least one subscriber station whose present data rate will be reduced to zero and reducing said present rate to zero and returning to step (a).

15. The method of claim 14 where in step (c), said determined subscriber station is selected randomly from said plurality of subscriber stations.

16. The method of claim 15, where said eligible subscriber station in step (a) is one of said plurality of subscriber stations without any reserved uplink resources with a data rate at least as high as any other subscriber station without reserved uplink resources.

17. The method of claim 15 where said lower data rate in step (a) is one step lower in said set of possible data rates.

18. The method of claim 15, where said eligible subscriber station in step (b) is one of said plurality of subscriber stations without any reserved uplink resources with a data rate at least as high as any other subscriber station without reserved uplink resources.

19. A system for transmitting data comprising:

-36-

a plurality of subscriber stations having a microprocessor, a modem, a radio and an antenna, each subscriber station operable to transmit a request for a dedicated data channel from a base station; and

a base station having a microprocessor, a modem, a radio and an antenna, and operable to receive said request for a dedicated data channel and further assign a dedicated data channel from a pool of available dedicated data channels to a requesting subscriber station in accordance with the method described in claim 1.

20. The system of claim 19, wherein each of said plurality of subscriber stations is operable to transmit a message to said base station, said message indicating one of a high amount of traffic waiting to be sent and a low amount of traffic waiting to be sent a level of queued packets to be sent to said base station.

21. The system of claim 19, wherein said base station can move said each of said plurality of subscriber stations to a different data rate in a set of possible data rates in response to receiving said message.

22. The system of claim 21, wherein said base stations moves said each of said plurality of subscriber stations to said different data rate in said set of possible data rates accordance with the method described in claim 6.

23. The system of claim 19, wherein said each of said plurality of subscriber stations is operable to transmit a message requesting reserved uplink resources to said base station.

24. The system of claim 21, wherein said base station is operable to allocate said reserved uplink resources in response to said message requesting reserved uplink resources to a requesting subscriber station.

25. The system of claim 24, wherein said base station allocates said reserved uplink

-37-

resources to said subscriber station in accordance with the method described in claim 10.

26. A subscriber station, having a microprocessor, a modem, a radio and an antenna, said subscriber station being operable to transmit a message to said base station over a dedicated data channel at a data rate selected from a set of possible data rates, said message indicating one of a high amount of traffic waiting to be sent and a low amount of traffic waiting to be sent to be sent to said base station.

27. Said subscriber station of claim 26, where said subscriber station is operable to transmit a request to said base station to reserve uplink resources for said subscriber station.

28. A base station, having a microprocessor, a modem, a radio and an antenna, and operable to receive a request for a dedicated data channel and assign a dedicated data channel from a pool of unassigned dedicated data channels in response to said request for a dedicated data channel, said base station further being operable to unassign said dedicated data channel back into said pool of unassigned dedicated data channels in order to honour said request.

29. The base station of claim 28, where said base station is operable to receive a message from a subscriber station, said message indicating one of a high amount of traffic waiting to be sent and a low amount of traffic waiting to be sent a level of queued packets to be sent to said base station, said base station further being operable to, in response to said message, move said subscriber station to one of a higher data rate and a lower data rate selected from a set of possible data rates.

30. The base station of claim 29, where said base station moves another subscriber station to a lower data rate selected from said set of possible data rates and moves said subscriber station to said higher data rate selected from said set of possible data rates.

31. The base station of claim 30, where said base station moves said subscriber station and

-38-

said another subscriber station to their respective said higher data rate and said lower data rate in accordance with the method described in claim 6.

32. A method of managing uplink resources in a network with a plurality of users, each user of said plurality of users being operable to transmit at a data rate selected from a set of possible data rates, the method comprising said steps of:

5 (a) defining at least one resource utilization threshold, said at least one resource utilization threshold being equal to said maximum allocation of a resource available in said network less a defined amount of safety margin;

(b) receiving a request from a first user for an allocation of uplink resources to said first user;

10 (c) if said present resource utilization of said network is:

(i) less than said at least one resource utilization threshold, then allocating said uplink resources to said user;

(ii) greater than said at least one resource utilization threshold, then determining an amount of uplink resources to be shed by a second user for reassignment to said first user and; said second user having been assigned a portion of uplink resources greater than a minimum uplink rate for at least a defined minimum hold time, and instructing said 15 second user to shed said uplink resources and reallocating said shed uplink resources to said first user.

33. The method of claim 32, where said uplink resources includes a plurality of dedicated 20 data channels and said at least one resource utilization threshold includes said number of assignable dedicated data channels in said plurality of dedicated data channels.

34. The method of claim 33, where said second user is a user without any reserved uplink resources.

25

35. The method of claim 34, where said second user is further said oldest user without said

any reserved uplink resources.

36. The method of claim 35, where said second user is further said oldest user of said plurality of users at a lowest data rate of said set of possible data rates without any reserved uplink resources.

37. The method of claim 33, where said uplink resources includes said data rates in said set of possible data rates for each assigned dedicated data channels and said at least one resource utilization threshold includes a maximum uplink load.

38. The method of claim 33, where said second user is a user with an assigned data rate higher than said first user.

39. The method of claim 38, where said second user is further said older user at said assigned data rate of said second user.

40. A method of managing uplink radio resources and assigning access to an uplink radio link in a network and data rates thereon, comprising a radio base station and a plurality of subscriber stations, comprising said steps of:

(a) comparing said present amount of radio resources available to said subscriber stations with a pre-selected amount;

(b) if said difference between said present amount and said pre-selected amount is less than a pre-selected safety margin, selecting at least one of said plurality of subscriber stations with assigned data rates whose assigned rate can be reduced and reducing said assigned data rates to make more radio resources available and returning to step (a);

(b) if said difference between said present amount and said pre-selected amount is less than said safety margin and if none of said plurality of subscriber stations can have its assigned rate reduced, selecting at least one of said plurality of subscriber stations and reducing its assigned data rate to zero and returning to step (a);

-40-

(c) if said difference between said present amount and said pre-selected amount is not less than said safety margin, determining if a subscriber station in said plurality of subscriber stations has requested allocation of a higher data rate than its present data rate and increasing said data rate assigned to said subscriber station and returning to step (a); and

5 (d) returning to step (a).